EUROPEAN JOURNAL OF BIOMEDICAL AND PHARMACEUTICAL SCIENCES
http://www.ejbps.com

ISSN 2349-8870
Volume: 7
Issue: 8
183-188
Year: 2020

# GENERAL DISCUSSION ON QUWAT E MUDARRIKA E ZAHIRA (EXTERNAL PERCEPTIVE FACULTIES)

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**Article Received on 04/06/2020** **Article Revised on 24/06/2020** **Article Accepted on 14/07/2020**

**ABSTRACT**
Unani system of medicine is known for its unique and important concepts. Basic principles of this system includes the concept of Umoor e Taba'iya (Seven Natural Factors). Arkaan, Mizaaj, Akhlat, Aaza, Arwah, Quwa and Af'aal. Quwa is a naturalised and specialised powers of every organs or tissues through which it performs specific functions. That may be for survival of individual or survival of species. It is the property through which it performs the basic functions of Human body. It maintains the phenomenon of life. Quwat is of three types of which Quwat e Nafsaniyah works for the intellectual, sensory and motor functions or for the functions of nervous system. The organs working under this Quwat are called Aaza e Nafsaniyah. The central or cheif organ is Brain. Sensory power of two types external Sensory power and Internal Sensory power. The sensory impulses carried from the sense organ to the brain through sensory nerve fibres.External Sensory Power is concerned with perception of forms and structure of things. External Sensory organs does this work. Internal Perceptive power is concerned with perception of meanings of the things which are Perceived by External sensory organ. The five external power is Power of Vision, power of hearing, power of Taste, power of Smell and power of touch.

**KEYWORDS**: Quwat e Nafsaniyah, Umoor e Taba'iya, Sensory Power, Aaza e Nafsaniyah.

## INTRODUCTION

The Unani System of Medicine is one of the oldest healthcare systems of the World. Originating in Greece (Yunan). Unani system of Medicine is a comprehensive medical system, which provides preventive, curative and Rehabilitative healthcare.

The Basic principles of this system includes the concept of Seven Natural Factors (Umoor e Taba'iya), these are the Essential factors for the Constitution of human body without which life of the individual is not possible. Simply, Describes man to be made up of the these seven factors. They are:

**Elements (Arkan):** What man and the Universe, both biological and non biological, including drugs are made up of.

**Temperament (Mizaaj):** Quality produced by Action and Reaction of two opposite qualities of elements. In General, it is a Quality of man, drug etc due to Quality of dominant elements.

**Humours (Akhlat):** The Liquid things in the body are called Akhlat. Their balance is health while disbalance is disease.

**Organs (Aaza):** The solid structures of the body.

**Pneuma (Arwah):** The Gaseous contents of the Body are called Arwah.

**Faculties (Quwa):** The physiological powers responsible for corresponding Basic functions of the Hamn body i.e Life, Nutrition, Sensation, Movement and Reproduction.

**Functions (Af'aal)**: Functions of various organs.

The Content of the article is extracted from the sixth factor of Umoor e Taba'iya, i.e Quwa or Faculties.

The word Quwa is the plural of word Quwat, and the word is derived from Arabic language.

Quwa is basically of three types: Quwat e Taba'iya(Natural power), Quwat e Nafsaniyat (Mental power) and Quwat e Haiwaniyah (Vital power).

Quwat e Taba'iya is concerned with functions if Nutrition, Digestion and metabolism.

Quwat e Nafsaniyah is concerned with sensory and motor functions.

Quwat e Haiwaniyah is concerned with Functions of Circulation and Respiration.

**Quwat e nafsaniyah** is again classified into two types:

Quwat e Muharrikah and Quwat e Mudarrikah.

**Quwat e muharrikah (Motor Faculty):** This Quwat is the cause for the movements in the body. Quwat e Muharrikah travels to the muscles via Nerves.

According to Ibn Sina, this Quwat is responsible for contraction and relaxation of muscles which is necessary for the movements of muscle.

Ali bin Abbas says that Quwat e Muharrikah Iradi (Voilational motor Faculty) situated in brain which reaches the muscles through cranial nerves or spinal nerves and is responsible for the movements of muscle.

**Quwat e Mudarrika (Sensory power of faculty)**
Power to sense. The Sensory fibres carrying the sensory message from the muscles to the Brain. Quwat e Mudarrika can be classified into two types.

1. Quwat e Mudarrika Andruni or Quwat e Mudarrika e Batina (Internal perceptive Faculties or internal sensory power).
2. Quwat e Mudarrika Beruni or Quwat e Mudarrika e Zahira (External perceptive faculties or External Sensory power).

Quwat e Mudarrikah Batina or Andaruni (Internal Perceptive Power)- This Faculty recognize and perceives the particular forms and meanings of those things which are perceived by external sensory faculties eg. Food, fruits etc.

In this paper, much more emphasis is given to External Sensory power.

**Quwat e mudarrika beruni or quwat e mudarrika e zahira (External perceptive faculties or external Sensory power)** is concerned with perception of Forms and structure of things. The organs which are having this power is called External Sensory Organs.

Also called as Hawas e Khamsa Zahira (Five external Sensory power). They are: Quwat e Basira (Power of Vision), Quwat e Sam'ia (Power of hearing), Quwat e Shamma (Power of Smell), Quwat e Zaiqah (Power of Taste) and Quwat e Lanisa (Power of touch).

Lightest stimuli is that of vision, compared with all external stimuli. Becoz only a picture is printed in the eyes. Object doesn't goes inside. Whereas in the sense of hear, sound waves enter the ear, in sense of smell-- lightest volatile particles goes inside the nose, in sense of taste-- object itself goes inside mouth and in sense of touch -- we are touching actual thing.

So lightest of all the stimuli is that of vision and heaviest is that of touch.

The order based on lightness to heaviness is:
Sense of vision
Sense of Hearing
Sense of smell
Sense of taste
Sense of touch

**Quwat e basira (Power of Vision)**
The power which perceives the color, light and structure of the object. The external sense organ working for it are Eyes. If eyes are not there then the whole world appear to be dark. That's why Rabban Tabri called Eye as Lamp of the Body.

Many physicians said it Noor e Basr (Light of the vision).

**Layers of Eye**
The eye has three main layers. These layers lie flat against each other and form the eyeball.

The outer layer of the eyeball is a tough, white, opaque membrane called the sclera (the white of the eye). The slight bulge in the sclera at the front of the eye is a clear, thin, dome-shaped tissue called the cornea.

- The middle layer is the choroid. The front of the choroid is the colored part of the eye called the iris. In the center of the iris is a circular hole or opening called the pupil.

The inner layer is the retina, which lines the back two-thirds of the eyeball. The retina consists of two layers: the sensory retina, which contains nerve cells that process visual information and send it to the brain; and the retinal pigment epithelium (RPE), which lies between the sensory retina and the wall of the eye.

The inside of the eye is divided into three sections called chambers.

- **Anterior chamber:** The anterior chamber is the front part of the eye between the cornea and the iris.

The iris controls the amount of light that enters the eye by opening and closing the pupil.

- The iris uses muscles to change the size of the pupil. These muscles can control the amount of light entering the eye by making the pupil larger (dilated) or smaller (constricted).

- **Posterior chamber:** The posterior chamber is between the iris and lens.

- The lens is behind the iris and is normally clear. Light passes through the pupil to the lens.

- The lens is held in place by small tissue strands or fibers (zonules) extending from the inner wall of the eye.

- The lens is very elastic. Small muscles attached to the lens can change its shape, allowing the eye to focus on objects at varying distances. Tightening (contraction) or relaxing these muscles causes the lens to change shape, allowing the eyes to focus on near or far objects (accommodation).

**Vitreous chamber:** The vitreous chamber is between the lens and the back of the eye. The back two-thirds of the inner wall of the vitreous chamber is lined with a special layer of cells (the retina): millions of highly sensitive nerve cells that convert light into nerve impulses Nerve fibers in the retina merge to form the optic nerve, which leads to the brain. Nerve impulses are carried through the optic nerve to the brain.

The macula, near the center of the retina at the back of the eyeball, provides the sharp, detailed, Central vision for focusing on what is in front of you. The rest of the retina provides side (peripheral) vision, which allows you to see shapes but not fine details.

- Blood vessels (retinal artery and vein) travel alongwith the optic nerve and enter and exit through the back of the eye. Fluid fills most of the inside of the eye. The chambers in front of the lens (both the anterior and posterior chambers) are filled with a clear, watery fluid called aqueous humor. The large space behind the lens (the vitreous chamber) contains a thick, gel-like fluid called vitreous humor or vitreous gel. These two fluids press against the inside of the eyeball and help the eyeball keep its shape.

The eye is like a camera. Light passes through the cornea and the pupil at the front of the eye and is focused by the lens onto the retina at the back of the eye. The cornea and lens bend light so it passes through the vitreous gel in the back chamber of the eye and is projected onto the retina. The retina converts light to electrical impulses. The optic nerve carries these electrical impulses to the brain, which converts them into the visual images that you see.

**Fluids of eye**

**Vitreous humor**

Vitreous is a transparent substance that is around 99 percent water. The remaining one percent is collagen and hyaluronicacid, which cause vitreous to have a gelatinous consistency. Along with maintaining the shape of the eye, the vitreous helps absorb shocks to the eye and keeps the retina properly connected to the back wall of the eye. Light passes through the vitreous on its way to the retina.

**Aqueous Fluid**

Aqueous is a thin, watery fluid located in the anterior and posterior chambers of the eye. Aqueous is a thin, watery fluid located in the anterior and posterior chambers of the eye. The anterior chamber lies between the iris (colored part of the eye) and the inner surface of the cornea (the front of the eye). The posterior chamber is located behind the iris and in front of the lens. In addition to supporting the shape of this area, aqueous supplies nutrients and nourishment to parts of the eye that lack blood supply. It also removes waste. Improper drainage of the aqueous humor can cause an increase in intraocular pressure (pressure inside the eye). This increase can result in loss of vision or contribute to the development of Glaucoma.

**Kaifiyat e absaar: Mechanism of vision**

Some physicians are of the view that some cone shaped Ray's falling from the eye and entering the object. Cone shaped rays whose Base will be towards the object and Apex will be towards the eye.

Some physicians are of the view that non rays will be emitted from the eye, instead the air between the object and eye have cone shaped rays that will attain the visionary quality.

Some physicians believe in printing or capturing of image inside the eye with the help of External air.

Ibn al Haytham who is known as Father of Optics, wrote a book on optics called Kitaab ul Manazir. He believed in 2nd concept. i.e the air which is present in between object and eye becomes a medium and in that come shaped Rays are formed base directed towards the eye and Apex towards the object. And the picture of that object enter the eye and finally to the centre of vision in brain through the optic nerves.

**How the light should be**

The light should be medium. If brightness is low, then there is difficulty to see clearly. Too much brightness is also dangerous to the eye.

**Visual pathway**

Visual receptors of retina carry impulses to first order neurons - Bipolar cells in inner nuclear layer ---> Further impulses are transmitted to 2nd order neuron-Ganglionic cells in ganglionic cell layer then to the Optic nerve --> Optic chaisma -->Optic tract --> Lateral geniculate body. optic radiation are formed which are carried to the Visual cortex. (Occipital lobe)

**Quwat e sami'a: (Power of hearing)** The Power which helps in perceiving the sound by detecting the vibrations (waves). The external organ which helps in hearing is Ear.

**Parts of Ear**
The ear is the organ of hearing and balance. The parts of the ear include:

External or outer ear, consisting of: Pinna or auricle.

**Pinna:** This is the outside part of the ear. External auditory canal or tube. This is the tube that connects the outer ear to the middle ear.

It is little bit curvy in structure. That's why Ibn Sina called it as Sadaf e Mu'avij (Curved cartilage).

**Importance of it's curvy structure**
Abu Sahl says that it is made curvy so that the sound waves becomes more forceful when they strike over the surface of Curved pinna. And it is of the shape of funnel, to collect the sound waves and transmit it to the Ear.

This hole or cavity ends on tympanic membrane.

**Tympanic membrane (eardrum):** The tympanic membrane divides the external ear from the middle ear.

**Middle ear (tympanic cavity),** consisting of:

**Ossicles**: Three small bones that are connected to each other and transmitthe sound waves to the inner ear. The bones named as Malleus, Incus, and Stapes. The top portion of Stapes consist of a small bone which is Similar to the size of Grain or corn, called as Azm e Adasi (Adas = Grain). Thats why the number of ear ossicles in some books is mentioned to be four in number (Including Azm e Adasi).

**Eustachian tube:** A canal that links the middle ear with the back of the nose. The eustachian tube helps to equalize the pressure in the middle ear. Equalized pressure is needed for the proper transfer of sound waves. The eustachian tube is lined with mucous, just like the inside of the nose and throat. **Inner ear,** consisting of: **Cochlea** This contains the nerves for hearing. Vestibule. This contains receptors for balance. Semicircular canals. This contains receptors for balance.

**Mechanism of hearing**
**Auditory pathway**
The external ear/pinna funnels sound waves into a unidirectional wave, and is able to direct it into the auditory canal. This sound then reaches the tympanic membrane, and causes it to vibrate. The louder the sound the bigger the vibration, the lower pitch the sound the slower the vibration.

The handle of the malleus articulates with the tympanic membrane, and the malleus also has an articulating facet for the Incus. The axis of rotation is maintained by two ligaments (the anterior malleal and posterior incudal ligaments). The incus lies in the epitympanic area, and is shaped like an anvil. It articulates with the stapes via its lenticular process.

The stapes is shaped like a stirrup, and impacts onto the oval window. The stapes moves like a piston, and causes the oval window to move in and out with sounds. There is a round window located below the oval window that moves out when the oval window moves in. Without it, there would be no transmission of the sound waves into vibrations in the inner ear. The sound waves are sent up the scala vestibuli to the apex of the cochlear duct (the helicotrema). Here it continues back down the spiral shaped cochlear organ in the scala tympani. The scala vestibuli and scala media are separated by Reissner's membrane. Scala media and scala tympani below are separated by the basilar membrane. When these waves move up and down the perilymph in the scala vestibuli and scala tympani, the vibrations move the basilar membrane. The organ of Corti lies on the basilar membrane, and is the organ responsible for converting these vibrations into electrochemical signals.

There are stereocilia (Hair cells) that lie on the organ of Corti. Their tips go into a gel like layer called the tectorial membrane. When vibrations move the basilar membrane, these hair cells bend, and potassium channels open. The influx of potassium causes the generation of a local current and then an action potential that is sent up the cochlear division of the vestibulocochlear nerve (cranial nerve8). This nerve then sends the signal to nuclei in the brainstem.

These include the cochlear nuclei. The information from the cochlear nerve passes to the ventral and dorsal cochlear nuclei. These nuclei are the first connection with the auditory information. The three major outputs of these nuclei are to the superior olivary complex (via the trapezoid body). The other half of the information is sent to the contralateral superior olivary complex. The second order neurons are sent via the lateral lemniscus to the inferior colliculus, which receives connections from from the superior olivary complex. The majority of these connections will ultimately terminate in the auditory cortex.

**Quwat e shamma (Power of smell)**
Sense of smell is a type of chemical stimuli. Some volatile substances will enter the nose through the inhaled air. The volatile substances dissolve in the mucosa of the nasal cavity which stimulates the olfactory nerve endings, which are present in the nasal cavity.

**Structure of nose**
The external nasal anatomy is quite simple. It is a pyramidal structure, with its root located superiorly and apex sitting inferiorly. The root is continuous with the anterior surface of the head and the part between the root and the apex is called the dorsum of the nose. Inferior to the apex are the two nares (nostrils), which are the openings to the nasal cavity. The nares are separated by

the nasal septum and are laterally bounded by the ala nasi (wings of the nostrils) which are the lateral processes of the septum.

The external nose is comprised of both bony and cartilaginous components. The bony part shapes the nose root, formed by the nasal, maxillae and frontal bones. The cartilaginous part is located inferiorly and is comprised of several alar, two lateral, and one septal cartilage:

- Alar cartilages; major alar cartilage forms the apex of the nose, minor alar cartilages support the ala nasi
- Lateral processes of the alar cartilage; form the dorsum of the nose
- Septal cartilage; bounds the nares medially

**Nasal cavity**

The internal part of the nose is the nasal cavity. The two nasal cavities sit within the external nose and the adjacent skull. The cavities open anteriorly to the face through the two nares. Posteriorly the cavities communicate with the nasopharynx by two apertures called choanae. Besides the anterior and posterior apertures, each nasal cavity has a roof, floor, and lateral and medial walls.

**Functions of nose**

Smell

First structure in Respiratory pathway

Prevents the entry of foreign substances inside the Respiratory tract (Hairs inside the Nose).

**Olfactory pathway**

Axons of bipolar olfactory receptors pierce the cribriform plate of ethmoid bone and reach the olfactory bulb. Here, the axons synapse with dendrites of mitral cells. Different groups of these synapses form globular structures called olfactory glomerull. Axons of mitral cells leave the olfactory bulb and form olfactory tract. Olfactory tract runs backward and ends in olfactory cortex, through the intermediate and lateral olfactory stria. Olfactory cortex includes the structures, which form a part of limbic system. These structures are anterior olfactory nucleus, prepytiform cortex olfactory tubercle and amygdala

**Quwat e Zaiqa: (Power of taste )**

The Quwat which is concerned with perception of stimuli of Taste.

**Anatomy of tongue**

The tongue is divided into two parts, an oral part at the front and a pharyngeal part at the back. The left and right sides are also separated along most of its length by a vertical section of fibrous tissue (the lingual septum) that results in a groove, the median sulcus, on the tongue's surface.

**Pathway for taste**

Receptors for taste sensation are the type III cells at taste buds. Each taste bud is innervated by about 50 Sensory nerve fibers and each nerve fiber supplies at least five taste buds through its terminals Contains 1st order neuron, 2nd and 3rd order neuron

First order neuron starting from taste buds and ends in nucleus of tractus solitarius. Second order neuron starting from nucleus of tractus solitarius ends in posteroventral nucleus of thalamus. Third order neuron starting from posteroventral nucleus of thalamus and ennding in parietal love of Cerebral cortex. Dendrites of taste buds enter the cranial nerve nuclei ends in tractus solitarius.

**Taste center**

Center for taste sensation is in opercular insular cortex, i.e in the lower part of postcentral gyrus, which receives cutaneous sensations from face. Thus, the taste fibers do not have an independent cortical projection.

**Quwat e Lamisa (Power of Touch)**

The power through which external things are perceived by touch. By the contact, the kaifiyat and the texture of the thing is known.The external sensory organ is Skin.

**Structure of Skin**

**Introduction**

Skin is the largest organ of the body. It is not uniformly thick. At some places it is thick and at some places it is thin. The average thickness of the skin is about 1 to 2 mm. In the sole of the foot palm of the hand and in the interscapular region, it is considerably thick, measuring about 5 mm. In other areas of the body, the skin is thin.

It is thinnest over eyelids and penis, measuring about 0.5 mm only.

**Layers of skin**

Skin is made up of two layers:

1. Outer epidermis
2. Inner dermis.

**Epidermis**

Epidermis is the outer layer of skin, it is formed by stratified epithelium. Important feature of epidermis is that it does not have blood vessels. Nutrition to the epidermis is provided by capillaries of Dermis.

**Dermis**

Dermis is the inner layer of the skin. It is a connective tissue layer, made up of dense and stout collagen fibers, fibroblasts and histiocytes. Collagen fibers exhibit elastic property and are capable of storing or holding water.

Collagen fibers contain the enzyme collagenase, which is responsible for wound healing. Concerned with perception of tactile sensations.

**Functions of skin**

Primary function of skin is protection of organs. However, it has many other important functions also

1. **Protective function**

Skin forms the covering of all the organs of the body and protects these organs from the following factors: Bacteria and toxic substances Mechanical blow.

**iii. Ultraviolet rays**

**Sensory function**

Skin is considered as the largest sense organ in the body. It has many nerve endings, which form the specialized cutaneous receptors These receptors are stimulated by sensations of touch, pain, pressure or temperature sensation and convey these sensations to the brain via afferent nerves At the brain level perception of different sensations occurs.

**Storage function**

Skin stores fat, water, chloride and sugar. It can also store blood by the dilatation of the cutaneous blood vessels.

**Synthetic function**

Vitamin D3 is synthesized in skin by the action of ultraviolet rays from sunlight on cholesterol.

**Regulation of body temperature**

Skin plays an important role in the regulation of body temperature. Excess heat is lost from the body through skin by radiation, conduction, convection and evaporation.

**Regulation of water and electrolyte balance**

Skin regulates water balance and electrolyte balance by excreting water and salts through sweat.

**Excretory function**

Skin excretes small quantities of waste materials like urea, salts and fatty substance.

**Absorptive function**

Skin absorbs fat-soluble substances and some ointments.

**Secretory function**

Skin secretes sweat through sweat glands and sebum through sebaceous glands. By secreting sweat, skin regulates body temperature and water balance. Sebum keeps the skin smooth and moist.

It perceive following kaifiyat:

Heatness and coldness
Moistness and dryness
Thickness and thinness
Softness and hardness
Smoothness and roughness
Lightness and heaviness

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